FIRST MONTHLY NARRATIVE REPORT

15 August 1964

REFERENCE   Declass Review by NGA.

REPORTING INTERVAL

1 July 1964 - 10 August 1964

OBJECTIVE

The objective of this program is the design, construction, and testing of a prenormalizing system to be used for problems of automatic target identification on aerial imagery. The prenormalizer will scan the image and, by special filtering techniques, produce a set of measurements which have minimal change with translation and rotation of the specific image on the scene. Testing is to be accomplished on the CONFLEX I Adaptive Recognition System.

STATUS OF ACTIVITIES AND ACCOMPLISHMENTS

Introduction

During the first reporting interval, effort has been devoted to both the analysis of the proposed system and the particular hardware embodiment to be built on this program. An abbreviated PERT schedule has been laid down to aid in the course of the hardware program.

Analyses

The current analyses of the prenormalizing technique include a computer simulation of a very simple system and a broad look at the general system concept. The computer simulation predicts the output of ideal bandpass filters operating on the integral scan sequence obtained from a collection of points (delta-functions) representing the image on the field. This is essentially a convolution process from which is obtained the superpositioned impulse responses resulting from each point in the image.

A simplified approach to defining the spectrum of the integral scan sequence is being sought which will permit deeper insight into the operation of the prenormalizing system. The initial phases of hardware design have taken precedence over the analytical work to which a greater effort will be devoted in later intervals.

THE PRENORMALIZING SYSTEM

The Scanning System

The specifications and general layout of the integral scanning system are essentially complete. The design calls for a table top apparatus with a horizontal platten on which the imagery will be placed. A 16 inch cylinder with 51 sampling slits (odd to provide interlace on the second half of the scan) will be situated underneath the platten along with the revolving diagonal mirror assembly which provides the scan. The photo-multiplier assembly with light collecting optics and a sleeved light baffle is situated over the platten. Electronics for the photomultiplier will be placed in a convenient location below the platten.

The Filter Bank

Several factors are being considered regarding the choice of filter bank components. These considerations center around the fact that the number of preliminary (first level) filters is considerably less than that required for the circular analysis. It is economically feasible, therefore, to consider a more selective filter at a higher cost than can be applied to the level of circular analysis. The latter circuitry being, by far, the bulk of the hardware will most likely be an in-house circuit. The circuit will be a filter with gain having an output suitable for interfacing with the CONFLEX I.

Interface Circuitry With CONFLEX I

The optical input facility to the CONFLEX I, although convenient, lacks the dynamic range and precision of input control desired for this program. For this reason, the use of a transistorized signal gate is being studied. In this way, the analog signals from the prenormalizer can be steered directly to the D-cell according to the M-sequence selection levels. If this is done, an auxiliary scheme for displaying the prenormalizer output will be investigated. A lamp bank matrix may be used for this purpose.

Time Spent On Project (Cumulative Total)

20 Hours
45 Hours

Technical Agreements Made

None

Difficulties Encountered

None

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PROGRAM FOR THE NEXT INTERVAL

During the next reporting interval, the final design and layout decisions will be made regarding the scanning system, the filtering system and the interface with the CONFLEX System. Any special parts known to be used in preliminary breadboard efforts will be ordered as they are needed. Some attention will be given to the analysis of the pre-normalizing technique, particularly in those areas affecting possible design decisions.

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SUBMITTED B

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